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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,890	04/12/2004	Young-Lae Kim	SEC.1145	2497

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EXAMINER

PAJOHI, TARA S

ART UNIT PAPER NUMBER

2112

DATE MAILED: 10/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/821,890

Applicant(s)

KIM, YOUNG-LAE

Examiner

Tara S. Pajoochi

Art Unit

2112

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 04/12/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Applicant cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Status of the Application

Claims 1-17 are pending in this applications.

Claims 1-17 are rejected under 35 U.S.C. 103.

If applicant is aware of any prior art or any other co-pending application not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

Claimed Foreign Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy of Application No. 2003-0041399 has been placed of record in the file.

Abstract

2. The abstract of the disclosure is objected to because of the following informalities:

Line 1 and 3, "focusing diode" is mentioned twice in the first sentence.

Correction is required. See MPEP § 608.01(b).

Specification

3. The disclosure is objected to because of the following informalities:

Paragraph 22, Line 4, "focusing diode" is referenced twice;

Paragraph 32, Line 2, "Fig. 1" appears to be a typographical error.

Should it be read as "Fig. 2" instead of "Fig. 1"?

Paragraph 44, Lines 3-4 refers to the controller as "14", however according to Figure 2, "40" is a controller.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1, 4, 5, 11, 13, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over the **Admitted Prior Art** by the applicant in view of **Cordingley (U.S. Patent # 6,181,728)**.

Considering **claim 1**, the Admitted Prior Art, as mentioned in Figure 1 and the detailed description of the instant application discloses an alignment measuring system, comprising:

- a. a focusing diode (18);
- b. a light source (14);
- c. a first splitter (16), adapted to direct a first part of the light emitted from the light source toward the wafer on the stage (10) ...the wafer receives the light...and reflects and/or diffracts at least a portion of that light back toward the first splitter (Paragraph 15);
- d. a second splitter (20), adapted to direct a first portion of the reflected/diffracted light from the wafer (10)...toward the focusing diode (Paragraph 15);
- e. an image sensor (12) adapted to receive a portion of the reflected/diffracted light from the second splitter (20) (Paragraph 15);
- f. a controller adapted to receive the information provided through the reference mirror, focusing diode, and image sensor to detect a focus for a positional state of the wafer (Paragraph 16)...to control the stage (10) on which a wafer is positioned in response to a control signal of a controller (Paragraph 13).

FIG. 1 (PRIOR ART)

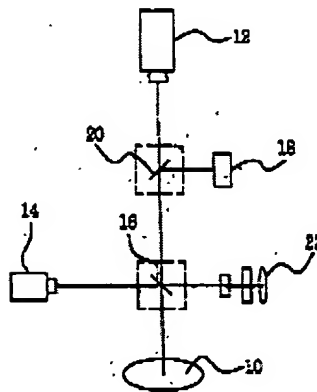


Figure 1: Reproduced from Kim U.S. Publication # 2004/0263828 A1

The Admitted Prior Art fails to disclose a controller adapted to receive the detection signal from the second splitter and to vary the respective power levels of the first and second portions of light.

In the same field of endeavor, Cordingley teaches a controller to adjust the input (1st portion of received light) to the polarization-modifying device (beam splitter) so as to cause the laser beam (2nd portion of received light) to be adjusted (Cordingley, Col. 7, L 5-9).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a controller to vary respective levels of the first and second portions of light, as taught by Cordingley in the Admitted Prior Art, since the invention increases the likelihood of successful disconnection of the link, despite slight misalignments

of the link with the laser beam due to positioning errors. For details see Column 3, second paragraph.

Regarding **claim 4**, and as applied to **claim 1** above, the Admitted Prior Art discloses a “second part of the light” along side the first splitter (see Figure 1 of the Admitted Prior Art) “emitted from the light source toward a reference mirror” (Paragraph 15).

As per **claim 5**, and as applied to **claim 4** above, the Admitted Prior Art fails to disclose wherein the first splitter is adapted to vary respective levels of the first and second parts of the light, under control of the controller.

Cordingley suggests using a controller to adjust the input (1st portion of light from the light source) to the polarization-modifying device (beam splitter) so as to cause the laser beam (2nd portion of light from the light source) to be adjusted (Cordingley, Col. 7, L 5-9).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a controller to vary respective levels of the first and second portions of light from the light source, as taught by Cordingley in the Admitted Prior Art, since the invention increases the likelihood of successful disconnection of the link, despite slight misalignments of the link with the laser beam due to positioning errors. For details see Column 3, second paragraph.

Considering **claim 11**, the Admitted Prior Art, as mentioned in Figure 1 and the detailed description of the instant application discloses a method for determining an alignment position of a wafer, comprising:

- a. a light source (14);
- b. directing a first part of the light emitted from the light source toward the wafer on the stage (Paragraph 15);
- c. the wafer (10) receives the light...and reflects and/or diffracts at least a portion of that light back (Paragraph 15);
- d. directing a portion of the reflected/diffracted light from the wafer...toward the image sensor (12, Paragraph 15);
- e. directing a portion of the reflected/diffracted light from the wafer...toward the focusing diode (18, Paragraph 15);
- f. detecting a focus for a positional state of the wafer is response to the information provided through the reference mirror (22), focusing diode (18), and image sensor (12, Paragraph 16);
- g. the reflected light (from the wafer) is dispersed to the image sensor (Paragraph 18);
- h. a light signal diffracted by an alignment mark on the wafer is detected to check the alignment position of the wafer (Paragraph 17); and

- i. an image sensor adapted to receive a portion of the reflected/diffracted light from the second splitter (Paragraph 15).

The Admitted Prior Art, however, does not specifically disclose varying a ratio of the first and second power levels in response to an applied control signal.

In the same field of endeavor, Cordingley discloses a method wherein a controller varies the ratio of the input (1st power level) to the polarization-modifying device (beam splitter) so as to cause the laser beam (2nd power level) to be adjusted (Cordingley, Col. 7, L 5-9).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a controller to vary respective levels of the first and second portions of light, as taught by Cordingley in the Admitted Prior Art, since the invention increases the likelihood of successful disconnection of the link, despite slight misalignments of the link with the laser beam due to positioning errors. For details see Column 3, second paragraph.

Considering **claim 13**, and as **applied to claim 11** above, the Admitted Prior Art discloses a method wherein detecting a focus for a positional state of the wafer further comprises:

- a. directing a portion of the light from the light source toward a reference mirror (paragraph 15); and

- b. providing light reflected from the reference mirror to the focusing diode (Figure 1).

For details see Paragraph 15 and Figure 1 of the Admitted Prior Art.

Regarding **claim 14**, and **as applied to claim 13** above, the Admitted Prior Art fails to disclose a method to vary the ratio of power levels of the first part of generated light and the second part of the generated light in response to a second applied control signal.

In the same field of endeavor, Cordingley discloses a method wherein a controller varies the ratio of the input (1st part of generated light) to the polarization modifying device (beam splitter) so as to cause the laser beam (2nd part of generated light) to be adjusted (Cordingley, Col. 7, L 5-9).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a controller to vary respective power levels of the generated light, as taught by Cordingley in the Admitted Prior Art, since the invention increases the likelihood of successful disconnection of the link, despite slight misalignments of the link with the laser beam due to positioning errors. For details see Column 3, second paragraph.

- 6. **Claim 2, 3, 6-8, 12, 15, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **the Admitted Prior Art** by the applicant in view of **Cordingley (U.S. Patent # 6,181,728)**, and further in view of **Guerin et al. (U.S. Patent # 5,251,057)**.

Regarding **claim 2**, and as **applied to claim 1 above**, the Admitted Prior Art and Cordingley fail to disclose a system in which a control signal controls the second splitter to focus the system by increasing the power level of the second portion and decreasing the power level of the second portion to align the state of the wafer.

Guerin et al. suggests using a “splitter to adjust the ratio or power level” of the output of the beams (Guerin et al., Col. 6, L 26-27). Guerin et al. also shows that “in order to achieve alignment...a means to rotate the laser (beam splitter)” is needed (Guerin et al., Col. 4, L 45-46).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a splitter to focus and align the state of the wafer by adjusting the ratio of power, as taught by Guerin et al. in the combination of the Admitted Prior Art and Cordingley, in order to provide a “finer adjustment” (Guerin et al., Col. 4, L 62).

Considering **claim 3**, and as **applied to claim 2 above**, the Admitted Prior Art discloses that the “first splitter is adapted to direct part of the light emitted from the light source toward the wafer” (Paragraph 15).

As per **claim 6**, and as **applied to claim 5 above**, the Admitted Prior Art and Cordingley fail to disclose a system wherein a first splitter is adapted to increase the power level of the second part while focusing the system and to decrease the power level of the second part of the light while determining the alignment state of the wafer.

Guerin et al. suggests using a “splitter to adjust the ratio of power level” of the output of the beams (Guerin et al., Col. 6, L 26-27). Guerin et al. also shows that “in order to achieve alignment...a means to rotate the laser (beam splitter)” is needed (Guerin et al., Col 4, L 45-46).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the first splitter to focus and align the state of the wafer by adjusting the ratio of power, as taught by Guerin et al. in the combination of the Admitted Prior Art and Cordingley, in order to provide a “finer adjustment” (Guerin et al., Col. 4, L 62).

Considering **claims 7 and 8, and each as applied to claim 1** above, the Admitted Prior Art and Cordingley fail to show wherein a splitter comprises a liquid crystal display device.

Guerin et al. suggests that a “liquid crystal polarization rotator (LCD as a beam splitter)...would provide a finer adjustment” (Guerin et al. Col. 4, L 58-62).

The Admitted Prior Art and Cordingley disclose all of the claimed limitation except for wherein a splitter consists of a liquid crystal display (LCD) device. The use of an LCD device as a beam splitter is very elementary teachings in this art as is mentioned by Guerin et al. Therefore, a LCD device acting as a beam splitter were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it

obvious to substitute the liquid crystal display device for a splitter in the alignment measuring system for superior control and adjustment.

Considering **claim 12**, and as applied to **claim 11** above, the Admitted Prior Art and Cordingley fail to disclose a system wherein varying the ratio of the first and second power level comprises decreasing the second power level and increasing the first power level to detect the focus for the positional state of the wafer, and while determining the alignment of a wafer.

In order to achieve “proper alignment,” Guerin et al. teaches the use of a (beam) splitter to adjust the ratio or power level (of the output of the beams) (Guerin et al., Col. 6, L 26-27).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a splitter to focus and align the state of the wafer by adjusting the ratio of power, as taught by Guerin et al. in the combination of the Admitted Prior Art and Cordingley, in order to provide a “finer adjustment” (Guerin et al., Col. 4, L 62).

Regarding **claim 15**, and as applied to **claim 14** above, the Admitted Prior Art and Cordingley fail to disclose a system wherein varying the power levels of the first and second parts of the generated light comprises decreasing the second power level and increasing the first power level to detect the focus for the positional state of the wafer, and while determining the alignment of a wafer.

Guerin et al. suggest using a “splitter to adjust the ratio or power level” of the output of the beams (Guerin et al., Col. 6, L 26-27). Guerin et al. also shows that “in order to achieve alignment...a means to rotate the laser (beam splitter)” is needed (Guerin et al., Col. 4, L 45-46).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a splitter to focus and align the state of the wafer by adjusting the ratio of power, as taught by Guerin et al. in the combination of the Admitted Prior Art and Cordingley, in order to provide a “finer adjustment” (Guerin et al., Col. 4, L 62).

Regarding **claim 16**, and **as applied to claim 11 above**, the Admitted Prior Art and Cordingley fail to disclose a system wherein varying the power levels of the first and second parts of the generated light comprises turning on and off a liquid crystal display device, in response to the applied control signal.

To achieve “proper alignment,” Guerin et al. teaches the use of a “splitter to adjust the ratio or power level” of the output of the beams and hence rotating the laser (Guerin et al., Col. 6, L 26-27). In order to provide finer adjustment, Guerin et al. suggests using a liquid crystal polarization rotator (liquid crystal display device) as a beam splitter (Guerin et al., Col. 4, L 58-62).

Guerin et al. discloses the claimed invention except for turning on and off a liquid crystal. It would have been an obvious matter of design choice to turn on and off a liquid crystal display device, since it is known in the art that a

LCD device is used for better control and finer adjustment and can operate in such a manner of being turned “on” and “off” by applying various control signals.

7. **Claims 9, 10, and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over the **Admitted Prior Art** by the applicant in view of **Cordingley (U.S. Patent # 6,181,728)**, and further in view of **Orino et al. (U.S. Patent # 5,627,669)**.

As per **claim 9 and 10**, and each as applied to **claim 1** above, the Admitted Prior Art and Cordingley fail to disclose a system wherein the splitter is adapted to rotate in response to the control signal.

Orino et al. discloses a “light splitting means... obtained through the optical member (light from the light source)... and driving means (controller) for rotatively driving the reflecting member (beam splitter)...in accordance with the position state of the light” (Orino et al., Col. 3, L 29-36).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to control the rotation of a beam splitter by a driving means (controller) as taught by Orino et al. in the combination of the Admitted Prior Art and Cordingley in order to successfully align the system.

Considering **claim 17**, and as applied to **claim 11** above, Cordingley and the Admitted Prior Art fail to disclose a method to vary the ratio of the

first and second power levels in response to an applied control signal using a mirror.

Orino et al discloses a “light splitting means (beam splitter)... obtained through the optical member (light from the light source)... and driving means (controller) for rotatively driving the reflecting member (mirror)...in accordance with the position state of the light” (Orino, Col. 3, L 29-36).

Orino et al. in the system of the Admitted Prior Art and Cordingley disclose the claimed limitation except for a mirror. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to rotate a mirror in an optical path of light in response to a control signal since a reflecting member and mirror are known equivalents to be used in an optical system to reflect/diffract light would be within the level of ordinary skill in the art.

Cited Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - a. Laor (U.S. Patent # 6,320,993 B1) discloses an alignment system in which a control signal operates two movable mirrors in order to maintain a desired pathway (Col. 3, L 24-32 and Col. 19, L 53-56).
 - b. Katz (U.S. Patent # 5,712,470) cites the use of a liquid crystal device to split the light beam (Col. 4, L 20-21).

Art Unit: 2112

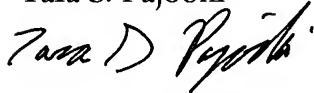
Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tara S. Pajoohi whose telephone number is 571-272-9785. The examiner can normally be reached on Monday through Thursday from 7:30 a.m. to 4:00 p.m, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm E. Ullah, can be reached on 571-272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

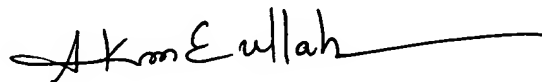
Tara S. Pajoohi



Assistant Patent Examiner

Art Unit 2112

October 24, 2006



Akm Enayet Ullah

Supervisory Patent Examiner (Trainer)

571-272-2361